**Comments Received on draft Ventura County MS4 Permit**
**December 27, 2006**

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**To: RWQCB-LA**

**Date: March 7, 2007**

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# Memorandum

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| Date: | March 7, 2007 |
| To: | Mark Grey, CICWQ |
| From: | Lisa Austin, Donna Bodine, and Eric Strecker, Geosyntec Consultants |
| Subject: | Comments on Draft Ventura County MS4 Permit, NPDES No. CAS004002 |

We have reviewed the Draft Ventura County MS4 Permit (NPDES No. CAS004002), dated December 27, 2006, and have identified the following technical issues:

## Municipal Action Levels

| Page | Comment |
|---|---|
| 23 | Finding F.11 establishes Municipal Action Levels (MALs) for selected pollutants (TSS, chemical oxygen demand, and total and dissolved cadmium, chromium, copper, lead, nickel, and zinc). The proposed MALs are based on median concentrations and coefficients of variation from the National Stormwater Quality Database (NSQD), Version 1.1. Per the Tentative Order, two exceedances of this median (central tendency concentrations) would be construed as a failure to implement adequate control measures and would constitute a violation of the MEP provisions of the permit. Issues with this provision include: 1) whether the MALs, as they were developed, are appropriate benchmarks for implementation of MEP for municipal urban runoff in Ventura County, 2) whether using a central tendency (median) of observed urban runoff quality is appropriate for setting MALs, and 3) whether a violation of the permit is the appropriate remedy for two violations of an MAL.<br><br>The MAL concept was developed by the State Water Resources Control Board's Blue Ribbon Panel to evaluate whether numerical effluent limits were feasible in stormwater NPDES permits. The Panel found that numerical effluent limits were not feasible for existing urban areas in the Municipal NPDES permit program. However, the panel suggested that MALs could be established that would indicate which areas were significantly above observed urban runoff concentrations. The panel listed three methods for setting MALs, including: 1) agreed upon |

concentrations "that were not acceptable" and gave a high copper concentration as an example; 2) a percentile approach, where using the 90th percentile "consistently in the outer limit (i.e. uppermost 10th percentile);" or 3) a statistically based population approach - "the idea would be to identify the [statistically derived] point at which managers feel concentrations are significantly beyond the norm" and gave two standard deviations above the norm as an example. Regardless of the method, the recommendation by the Blue Ribbon Panel was that a value be selected that would be an indicator of runoff being well outside (above) the norm. The panel suggested that local data sets be employed, if possible, and listed various programs with significant monitoring data in California. It listed the national database as the last option. The panel recommended that if a watershed exceeded an action level, that it would "trigger an appropriate management response. This approach … would ensure that the "bad actor" watersheds received needed attention." They did not recommend that exceeding the MAL would be a violation of the permit.

The NSQD evaluates concentrations observed in end of pipe discharges, using data collected by municipal stormwater programs throughout the U.S. The proposed MALs were based on the median concentrations for all U.S. data, although most data in this data set are from the east coast of the U.S. For example, the EPA Rain Zone in which Ventura County is located (Zone 6), represents only 9.5% of the data in the NSQD. Rain Zones represent geographic regions with similar climatic conditions, which the NSQD demonstrates appeared to affect some constituent concentrations. In the establishment of MALs, a more local runoff quality analysis should have been performed using Zone 6 data for all parameters where adequate data exists.

Using the median for each pollutant implies that all monitored sites must be at or above the "central tendency" of the available data. The recommendation from the Blue Ribbon Panel was that action limits should start at a concentration that is out of the norm, for example, the upper 10th or 20th percentile (higher concentrations) such that they are aimed at the "bad actor sites." Using a median multiplied by a coefficient of variation (with a maximum COV of 2) of all of the data implies that one must be better than average wherever monitoring is completed. A comparison the proposed MALs to the 80th, 90th, and 95th percentiles of the Zone 6 data is shown in the table below.

| Pollutant | Proposed | Zone 6 Data |
|---|---|---|

| | MAL | Count | % Non-Detect | 80th Percentile | 90th Percentile | 95th Percentile |
|---|---|---|---|---|---|---|
| TSS (mg/l) | 106.2 | 268 | 0.4% | 252 | 513 | 941 |
| COD (mg/l) | 58.3 | 203 | 1.0% | 306 | 361 | 468 |
| Cadmium Total (ug/l) | 2.0 | 223 | 32.3% | 2 | 3 | 4 |
| Cadmium Dissolved (ug/l) | 0.55 | 161 | 61.5% | 0.4 | 0.8 | 1 |
| Chromium Total (ug/l) | 10.5 | 221 | 1.4% | 22 | 34 | 51 |
| Chromium Dissolved (ug/l) | 1.5 | 156 | 36.5% | 2.8 | 3.8 | 5 |
| Copper Total (ug/l) | 32.0 | 252 | 1.6% | 87 | 120 | 180 |
| Copper Dissolved (ug/l) | 12.8 | 176 | 9.7% | 20 | 33 | 44 |
| Lead Total (ug/l) | 30.6 | 272 | 5.5% | 122 | 225 | 310 |
| Lead Dissolved (ug/l) | 6.0 | 213 | 49.3% | 7 | 22 | 40 |
| Nickel Total (ug/l) | 9.6 | 241 | 3.3% | 32 | 54 | 68 |
| Zinc Total (ug/l) | 232 | 259 | 1.2% | 660 | 1,120 | 3,800 |
| Zinc Dissolved (ug/l) | 104 | 151 | 2.6% | 200 | 1,300 | 3,150 |

The State Water Board Stormwater Expert Panel in their report (June, 2006) said:

For catchments not treated by a structural or treatment BMP, setting a numeric effluent limit is basically not possible. However, the approach of setting an "upset" value, which is clearly above the normal observed variability, may be an interim approach that would allow "bad actor" catchments to receive additional attention. For the purposes of this document, we are calling this "upset" value an ***Action Level*** because the water quality discharged from such locations is enough of a concern that most all could agree that some action should be taken. Action Levels could be developed using at least three different approaches. These approaches include: 1) consensus based approach; 2) ranked percentile distributions; 3) statistically-based population parameters.

The Expert Panel meant that the concentration be set for Action Levels to "above normal observed variability." A median is clearly not above normal variability. Later the Expert Panel comments on the percentile of the "uppermost 10th percentile" as being appropriate.

Another potential issue is the age of the data included in the NSQD. For example, the extent of San Francisco Bay area data ranges from 1988-1995. These runoff data do not reflect the state of the practice in BMP implementation.

Finding F.11 also states "on or after (first October in year 3 after permit adoption), two or more exceedences of a MAL will be construed as a failure to implement adequate control measures and will be considered a violation of the MEP provisions of this Order". We believe that this is too stringent of a requirement. For example, other stormwater permits with parameter benchmarks, such as the EPA Multi Sector General Permit and California's Draft Industrial General Permit, require implementation of additional appropriate BMPs, if benchmarks are exceeded. The Expert Panel recommended that the action limits be used to "trigger appropriate management response." There should be a similar provision in the Permit and the Permit should provide solely that a violation occurs if the Copermittee fails to take action to identify sources and strengthen BMPs if exceedences of properly set MALs occurs on a substantial number of occasions.

**BMP Maintenance and Dewatering Numeric Discharge Limitations**

| Page | Comment |
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| Pg. 26 | Part 1 B.2.(14), footnote 3, requires that all stormwater BMPs be maintained at a frequency as specified by the manufacturer. Note that non-proprietary, public domain structural treatment BMPs (such as basins, swales, and bioretention areas) are not supplied by manufacturers, but instead are designed and constructed by the project proponent. This requirement may be better stated as: "…stormwater BMPs shall be maintained per an approved Operations and Maintenance Plan."<br><br>The footnote continues to state that stormwater BMPs may be drained to the MS4 if the discharge is not a "source of pollutants." Note that some structural treatment control BMPS can be physically located within the MS4, such as swirl concentrators. This fact not withstanding, the requirement would be better stated to say that such dewatering discharges should not be a "*significant* source of pollutants," as all treated stormwater contains some pollutants, but not necessarily at levels of concern. The purpose of this requirement is to establish a threshold of what is "significant" (see comment on pgs. 79 – 80 below). |
| Pgs. 79-80 | Part 4 G.6.g.3 mandates numeric discharge limitations for dewatering treatment BMPs for maintenance purposes prior to discharge to the MS4, for 13 constituents including bacteria, metals, nutrients, and conventional parameters such as TDS and TSS. Although the draft Order indicates the limits are from the |

Basin Plan (water quality objectives for receiving waters) and EPA Parameter Benchmark Values, limits for some constituents (e.g., TDS, nitrogen, oil and grease) do not appear to be based on these sources.

The basis for the discharge limits proposed (Table 10, Pg 80) for metals (copper, lead, nickel, and zinc) is not clear, and do not appear to be based on a consistent hardness concentration. Assuming the discharge limits are based on the acute CTR criteria (which would be more appropriate than chronic criteria for such a short term discharge) for total recoverable metals, the discharge limits correspond to the following hardness concentrations: 160-170 mg/L for copper; <25 mg/L for lead; <25 mg/L for nickel; and 150 mg/L for zinc. The Permit should explain the basis for the metals discharge limits (e.g., what hardness values were assumed, is the hardness assumed to be representative of the discharge or the receiving water, etc.)

To evaluate whether the discharge limits could be difficult to achieve with typical stormwater treatment BMPs, we screened the discharge limits against effluent data from recent analyses of the International Stormwater BMP Database (Geosyntec Consultants and Wright Water Engineers, Inc., 2006). (Constituents evaluated include TSS, TDS, nitrate and nitrite, and total copper, lead and zinc.). Effluent data from the BMP database indicate standard treatment BMPs can usually meet most of the proposed discharge limits. However, based on the BMP database, it may be difficult to meet the proposed discharge limits for lead and copper.

As an alternative to establishing numeric limitations on BMP dewatering discharges, an appropriate narrative limitation could be established. For example:

> Treated water removed from stormwater ponds, vaults, or oversized catch basins for to facilitate BMP maintenance may be discharged to the MS4. Stormwater ponds, vaults and oversized catch basins contain substantial amounts of liquid, which hampers the collection of solids and pose problems if the removed waste must be hauled away from the site. Water removed from these facilities may be discharged back into the pond, vault, or catch basin provided:
>
> - Visibly clear water removed from a stormwater treatment structure may be discharged directly to a downgradient cell of a treatment pond or into the MS4.

- Turbid water may be discharged back into the structure it was removed from if:
  - the removed water has been stored in a clean container (eductor truck, Baker tank, or other appropriate container used specifically for handling stormwater or clean water);
  - there will be no discharge from the treatment structure for at least 24 hours; and
  - the separated solids are properly disposed.
- The discharge must be approved by the MS4 owner/operator.

Also, an additional disposal option for residual water within a treatment control BMP when being maintained should be infiltration or dispersion across adjacent disconnected vegetated area, provided this is done without causing flooding or other adverse impacts.

**New Development and Redevelopment – Low Impact Development and Imperviousness**

| Page | Comment |
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| Pg. 5 | Finding B.10 discusses the relationship between the degree of imperviousness in a watershed and the degradation of the receiving water. Finding B.10 states that significant declines in the biological integrity and physical habitat of streams and other receiving waters have been found to occur with as little as 3 – 10 percent imperviousness. The finding states that percentage of impervious cover is a "reliable indicator and predictor of potential water quality degradation expected from new development." The following comments are related to these statements. |

First, the studies that have related imperviousness to stream impacts occurred in watersheds that did not include stormwater mitigation facilities, or may have included flood control facilities or minimal treatment control BMPs that were not designed to current standards. Therefore, the statement in the finding should be modified to state that significant declines in the biological integrity and physical habitat of streams and other receiving waters have been found to occur with as little as 3 – 10 percent of uncontrolled imperviousness.

There is much discussion about the reliability of imperviousness as a "predictor" of potential impacts from new development. In fact, the effects of imperviousness on hydromodification impacts is much more complicated than a simple correlation with imperviousness. The limited hydromodification impact research to date has focused on empirical evidence of channel failures in relationship to directly connected impervious area (DCIA) or total impervious area. However, more recent research has established the importance of size of watershed, channel slope and materials, vegetation types, and climatic and precipitation patterns (SCCWRP 2005a, Balance Hydrologics, 2005). Impervious area that drains directly to a storm drain system and then to the receiving water is considered "directly connected," whereas impervious area that drains through vegetation prior to surface waters or to infiltration facilities is considered "disconnected."

Booth et al. (1997) reported finding a correlation between loss of channel stability and increases in DCIA. In Washington State, streams were found to display the onset of degradation when the DCIA increases to ten percent or more, and a lower imperviousness of five percent was found to cause significant degradation in sensitive watersheds (Booth 1997). The Center for Watershed Protection (Schuler and Holland, 2000) described the impacts of urbanization on stream channels and established thresholds based on total imperviousness within the tributary drainage area. It states "a threshold for urban stream stability exists at about 10 percent imperviousness." It further states that a "sharp threshold in habitat quality exists at approximately 10 percent to 15 percent imperviousness." These studies, however, addressed changes in very different climatic regions than Southern California.

Although physical degradation of stream channels in semi-arid climates of California may be detectable when watershed imperviousness is between three and five percent, not all streams will respond in the same manner (SCCWRP, 2005b). Management strategies need to account for differences in stream type, stage of channel adjustment, current and expected amount of basin imperviousness, and existing or planned hydromodification control strategies. The absolute measure of watershed imperviousness that could cause stream instability depends on many factors, including watershed area, topography, land cover, and soil type; development impervious area and connectedness;

longitudinal slope of the river; channel geometry; and local boundary materials, such as bed and bank material properties and vegetation characteristics.

In summary, per Schueler's *Cautionary Note* (Schuler and Holland, 2000), while the research on impervious cover and stream quality is compelling, it is doubtful whether is can serve as the sole foundation for legally defensible regulatory actions at this time. Key reasons include: 1) the research has not been standardized, so different investigators have used different methods to define and measure/estimate imperviousness; 2) researchers have employed a wide number of techniques to measure stream quality characteristics that are not always comparable to each other; 3) most of the studies have been confined to a few ecoregions, and few studies have been conducted in Southern California; 4) the absolute measure of watershed imperviousness that could cause stream instability depends on many factors, including watershed area, land cover, vegetative cover, topography, and soil type; development impervious area and connectedness; longitudinal slope of the river; channel geometry; and local boundary materials, such as bed and bank material properties and vegetation characteristics; and 5) none of the studies has yet examined the effect of widespread application of stormwater treatment, LID controls and/or hydromodification control practices on impervious cover/stream quality relationships.

Pg. 21 Finding F.5 states that the Order promotes a land development and redevelopment strategy that considers the water quality and water management benefits associated with "smart growth techniques" and further states that such measures include: "hydromodification mitigation requirements, minimization of impervious surfaces, integrated water resource planning, and low impact development guidelines." These stormwater mitigation requirements and management strategies are not smart growth techniques. On the contrary, the imposition of these inflexible requirements and strategies without consideration of the smart growth planning principles will discourage smart growth. Smart growth is best described as a set of 10 principles (U.S. EPA, 2005):

1. Create a range of housing opportunities and choices.

2. Create walkable neighborhoods.

3. Encourage community and stakeholder collaboration.

4. Foster distinctive, attractive places with a strong sense of place.

5. Make development decisions predictable, fair, and cost effective.

6. Mix land use.

7. Preserve open space, farmland, natural beauty, and critical environmental areas.

8. Provide a variety of transportation choices.

9. Strengthen and direct development toward existing communities.

10. Take advantage of compact building design.

The imposition of standardized limitations on effective impervious area and hydromodification control for all projects, without consideration of project scale or geographic location, is particularly contrary to the smart growth concepts. As illustrated in Table 2 of the EPA document (page 23), the Order should relate requirements for conventional and site design (or "LID") BMPs to the development context. Some approaches will work in most settings (at different levels of implementation), while others pose challenges in existing urban areas and in the development of new town centers or other compact districts that are constructed in greensfield projects. The imposition of a single maximum effective imperviousness without consideration of other watershed factors can lead to more "sprawl" as projects will require more land to meet the requirement.

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Part 4 E.1(b) requires Permittees to "minimize pollutants emanating from impervious surfaces by reducing the percentage of Effective Impervious Area to less than 5 percent of total project area" for all new development and redevelopment projects. There are several concerns with this blanket requirement. First, as stated above, this limitation is presumably based on the existing literature that correlates watershed imperviousness with the biological integrity and physical habitat of streams and other receiving waters. Use of this information is premature as it has not been developed locally. The draft Order does not consider the spatial scale on which this requirement is based (e.g., watershed scale), but instead applies it to all projects, great and small, no matter where they are located. Many receiving waters are not affected by changes in runoff volumes, including lakes, bays, estuaries, hardened channels, etc. and therefore such a stringent limit for purposes of protecting stream geomorphology is not needed in all cases. This blanket requirement ignores the need to promote urban infill, redevelopment, and dense districts in new development projects as identified in the smart growth principles vs. sprawling development outwards. The resulting sprawl then can create more urban impacts on a watershed scale. A more appropriate requirement for redevelopment projects would be to not increase or achieve some reasonable reduction in effective impervious area via employing vegetated systems to the extent practicable.

Footnote 1 on the bottom of page 50 defines "Effective Impervious Area" to mean that portion of the impervious area that is hydrologically connected via sheet flow or a discrete hardened conveyance to a drainage system or a receiving water body. "Impervious surfaces may be rendered "ineffective" if the stormwater runoff is dispersed through properly designed vegetated swales (native vegetation) using approved dispersion techniques." This definition is problematic for several reasons. The definition of Effective Impervious Area (EIA) (as the concept was originally developed) is "the impervious area with a direct connection to downstream drainage systems" (Booth, 1997). The concept of EIA was originally developed to more accurately predict the effects on stream systems of runoff from developed watersheds, rather than using total impervious area (TIA). As stated above, these studies were conducted at a time when widespread application of stormwater treatment and/or hydromodification control practices had not occurred, so did not consider the effects of flows from impervious surfaces that entered the drainage system then were subsequently conveyed to a vegetated stormwater control facility prior to discharge to the stream channel.

This definition of EIA is most applicable to very low density residential areas where impervious areas could be rendered "truly" ineffective by routing runoff over long lengths of pervious area, with a high ratio of pervious area to impervious area. The value of routing large impervious areas through minimal vegetation is less certain, and would not likely render the impervious area as "ineffective" or "disconnected" to the nearly the same level as less dense development. An evaluation of the hydrologic benefits of infiltration-based urban stormwater management (Holman-Dodds et al, 2003), investigated the potential for reducing the hydrologic impacts of urbanization by using infiltration-based, low impact storm water management techniques. The results of this analysis showed that it was possible, by manipulating the layout of developed landscapes, to reduce impacts on hydrology in comparison to traditional, direct discharge of runoff (i.e., without treatment in a vegetated BMP). However, the amount of reduction in impact was found to be sensitive to both the rainfall amount and soil texture, with greatest reductions being possible for small, more frequent events and more pervious soil textures (e.g., Type A or B soils versus Type C or D soils). The analysis found that even if a project's impervious areas were routed across an equivalent pervious area to promote infiltration (i.e., 50% of the site used for disconnection), that hydrologic impacts were not fully mitigated. Thus, it is important to realize that development projects are not likely to be able to fully mitigate hydrologic impacts via disconnection of impervious surfaces as defined in footnote 1.

The definition if footnote 1 also limits dispersion of site runoff to vegetated swales with native vegetation, which is an unnecessary limitation on this LID technique. Conveyance of site runoff through any type of vegetation or treatment in all types of vegetated treatment BMPs would assist in reducing hydrologic impacts of impervious surfaces. This would include conveyance and/or treatment in vegetated swales (with any type of vegetation), as well as treatment in bioretention areas, vegetated extended detention basins, and infiltration facilities, for example. These approaches to minimizing flow increase impacts should also be allowed. Perhaps requiring that vegetation be climate appropriate (e.g., low water, fertilizer, and pesticide demand) would be more appropriate.

Part 4 E.1(c) requires the minimization of percentage impervious surfaces on development lands to support the percolation and infiltration of stormwater into the ground. This blanket requirement appears to require low density zoning in order to protect receiving waters, which is counter to smart growth principles and instead would promote urban sprawl. Again, on a watershed scale, it is important to promote areas of local high density (high imperviousness) in order to minimize overall imperviousness at the watershed scale. This condition may be better stated as: "Reduce impervious surfaces at the watershed scale through the promotion of better site design techniques such as clustering development and promoting infill on a watershed scale to preserve open space, and at a project scale allowing for narrower streets and sidewalks, minimizing cul-de-sacs, reducing parking requirements, and providing treatment and volume reduction opportunities where appropriate.

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Part 4 E.I.1. requires Permittees to integrate LID into all new development and redevelopment projects. Unless the use of storage and reuse is considered LID, this provision would not be appropriate for projects desiring to reuse stormwater for irrigation (integrated water resource management). In the case of reuse, LID techniques would reduce the volume of runoff that could be stored and reused. In addition, in the case of urban infill, redevelopment, and dense districts in new development projects as identified in the smart growth principles, the use of LID techniques may be difficult at the individual project or lot level because sufficient space on a particular lot may not be available for devotion to open space. However, these types of projects could be considered a LID practice (clustering development and/or locating it per smart growth principles) if examined at the watershed scale. Another consideration is that when a new project can also treat existing development runoff in a larger regional treatment system along with runoff from the new project (i.e., proved retrofit of existing development), so requiring that LID must be employed instead of regional treatment could reduce the opportunities and resources for retrofit treatment.

The guidance LID Technical Guidance Document should identify smart growth principles, such as the promotion of infill and redevelopment projects, and incorporate guidance on the types of LID techniques that are feasible for urban infill, redevelopment, and dense districts in new development projects as identified in the smart growth principles. The guidance document should incorporate the concept of spatial scales in land development, and discuss all scales (lot, land use, subdivision, subwatershed, watershed) in the application of LID techniques. In addition to flexibility to develop an appropriate manual to encourage infill, Copermittees should be able to exempt certain types of projects from lot-based LID techniques, as discussed in our next comment.

**New Development and Redevelopment – Hydromodification Control**

| Page | Comment |
|---|---|
| Pg. 52 | Part 4 E.II.1(a) requires that *all* new development and redevelopment projects implement hydrologic control measures to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. This requirement should not apply to new development and redevelopment projects where the project discharges stormwater runoff into creeks or storm drains where the potential for erosion, or other impacts to beneficial uses, is minimal or nonexistent. Such situations may include discharges into creeks that are concrete-lined or significantly hardened (e.g., with rip-rap, sackrete, etc.), storm drains |

discharging directly to the ocean, lake, or other waterbody that is not susceptible to erosion, and construction of infill projects in highly developed watersheds where the potential for single-project and/or cumulative impacts is minimal. This condition should also not apply to redevelopment projects that do not increase impervious surfaces, or that reduce impervious surfaces, as these projects would not cause hydrologic impacts. There are a number of stream systems where degradation is already occurring and where having the last few projects being developed employ significant hydromodification controls would not solve the existing hydromodification problem. There should be an allowance for the use of naturalized stream stabilization techniques in these cases.

The second and third sentences in Part 4 E.II.1(a) suggest that the purpose of the hydrologic controls is to minimize impacts by maintaining each project's pre-development stormwater runoff flow rates and durations. Actually, the purpose of the hydrologic controls is stated in the first sentence, which is to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. Maintaining project stormwater runoff flow rates and durations would be one type of hydrologic control to achieve that purpose, but contradicts other implementation standards and methods allowed by the Permit and may not be feasibly achieved or necessary for a variety of projects, depending on local factors related to channel stability, including watershed area, topography, land cover, soil type, development of impervious area and connectedness of impervious area, channel slope and materials, etc. The implementation methods for this purpose should be developed through the Hydromodification Control Plans required in Part 4 E.II.1(g). The purposes as currently stated would not allow for watershed-based solutions that balance project-based controls with off-site controls, and so not allow sufficient flexibility to develop local hydromodification control plans and programs.

Part 4 E.II.1(c) stipulates "Hydrologic Control in natural drainage systems shall be achieved by maintaining the Erosion Potential ($E_p$) in streams at a value of 1, unless an alternative value can be shown to be protective of the natural drainage systems from erosion, incision, and sedimentation that can occur as a result of flow increases from impervious surfaces and damage stream habitat."

Again specifying an Ep of 1 mandates an implementation method for hydromodification control without allowing for consideration of local factors affecting channel stability as recommended by scientific literature. Requiring an

Ep equal to 1 is not necessary for all projects. For example, the Santa Clara Valley Urban Runoff Pollution Prevention Program HMP Report (SCVURPPP, 2005) Chapter 3 states "it is unrealistic to believe that stream channels will behave such that a single Ep threshold value can be specified that, if exceeded, would always result in unstable channel conditions; or conversely, if less than would always be stable. Because of natural variability in stream attributes and also considering uncertainties in the methodology, the threshold of adjustment was represented as a logistic regression, which was developed using data from three test subwatersheds within the Santa Clara Basin." The SCVURPPP HMP incorporated an Ep of 1.2 , as this Ep would be protect the vast majority of stream conditions. Although, the revised SCVURPPP Permit condition adopted by the San Francisco Regional Board included a management standard based on maintaining an Ep of 1 for stream segments downstream of a project's discharge point, it also incorporated several performance criteria that are to be used to implement the management standard. These details are important in that they allow for flexibility in implementation methods chosen to achieve hydromodification control.

A hydromodification control requirement should only be in place for projects that drain to potentially sensitive receiving waters. If the project drains to the ocean, a lake, a large river that would not be affected, or a hardened channel or pipe system that does not, within the potential area of effect for a given discharge, drain to a sensitive system, then meeting an Ep standard is not necessary. If a project drains to a system that is already largely impervious or otherwise degraded, then requiring an Ep standard for that project will not solve the problem. In this case, there should be provision for watershed planning that could include regional projects such as stream restoration (using environmentally sound approaches), and allow for the development project to contribute financially to the regional projects, which would likely be much more effective in protecting habitat. For some larger rivers, an Ep standard may not be necessary, as some increased runoff would not cause hydrologic impacts, as larger, infrequent floods that "re-set" channels dominate the geomorphic processes (Balance Hydrologics, 2005). In summary, it is important to not prejudge in the permit the appropriate hydromodification control standard and implementation methods for Ventura County without proper consideration of local watershed and channel stability factors. Instead, the Permit should allow the SMC study and HMP planning process to occur, so as to develop appropriate hydromodification control standards based on best available science and localized watershed conditions.

Part 4 E.II.1(d) references the SMC hydromodification study. Note that SCCWRP has been awarded a 2005-2006 Consolidated Grant to complete this study, called Development of Tools for Hydromodification Assessment and Management (PIN #9426). The draft Permit language should be modified to reflect the following revised description of the SMC hydromodification study. The goal of the project is to develop a series of tools for implementation of hydromodification management measures that could be used to better protect the physical, chemical, and biological integrity of streams and associated beneficial uses. The project will provide tools to answer the following questions: 1) Which streams are at the greatest risk of effects of hydromodification? 2) What are the anticipated effects in terms of increased erosion, sedimentation, or habitat loss, associated with increases in impervious cover? 3) What are some potential management measures that could be implemented to offset hydromodification effects and how effective are they likely to be?

The SCCWRP project will consist of four technical tasks. The first task will involve developing a mapping and classification system for streams based on their susceptibility to the effects of hydromodification. Susceptibility will be evaluated based on both current properties and conditions of the stream and future increases in impervious cover. The relatively susceptibility of different stream types will classified based on the erodibility of different channel boundary materials, channel evolution stage, floodplain connectivity, geologic controls, and other factors. Such a system will help managers prioritize streams for protection and management. The second task will establish protocols for ongoing monitoring that are carefully designed to assess the effects of hydromodification. Development of standard monitoring protocols for hydromodification effects will facilitate regional information sharing on project performance. The third task will involve development and calibration of dynamic models to assess the effects of hydromodification on stream condition. These models will likely couple hydrologic simulations, physical process models, and risk-based modeling. The result will be a "cost-effective tool" that could be used to assess the likelihood of stream channel response to expected changes in hydrology associated with changes in land use patterns. The fourth task will involve development of a series of tools that managers can easily apply to make recommendations or set requirements relative to hydromodification for new development and redevelopment. These tools will utilize the results of the classification system, monitoring, modeling, and assessment completed under the first three tasks to develop a series of plots, nomographs, checklists, or similar management tools.

It is envisioned that tools for three different levels of analysis would be developed: *Screening tools* to allow planners and managers to evaluate whether or not a project is likely to be of concern for hydromodification; *Effects tools* to evaluate the expected magnitude or intensity of effect associated with a particular project; and *Mitigation tools* to guide recommended mitigation and management measures. This grant funded project will provide a sound foundation for the development and implementation of the Hydromodification Control Plans required in Part 4 E.II.1(g).

Pg. 53 Part 4 E.II.1(e) requires Permittees to continue to implement specific Interim Hydromodification Criteria (which requires a Hydromodification Analysis Study (HAS) for land disturbance of fifty acres or greater), until completion of the Southern California Storm Water Monitoring Coalition (SMC) Hydromodification Control Study. This essentially requires individual projects greater than 50 acres to implement the same types of studies that SMC will implement on a regional basis, but a regional scale (not a 50-acre project scale) is more appropriate for a hydromodification control study. Also, if Copermittees rely solely on the HAS process, any Copermittee may establish different interim hydromodification control criteria than a neighboring municipality, which could lead to confusion for project proponents as to which criteria to apply to proposed projects, and inconsistent hydromodification control on a project by project basis. Therefore, an appropriate interim hydromodification standard should be developed as a guideline for projects greater than 50-acres, unless an HAS is done that supports a different standard and approach to hydromodification control.

The interim standard requirement for projects less than 50 acres to match the 2-year hydrograph (flow, volume, and duration) is insufficient to protect natural stream channels from the effects of hydromodification. Palhegyi et al (2005) compared the following flow control methods in terms of erosion potential (Ep): peak flow controls, hydrograph matching, and flow duration matching. While hydrograph matching was found to be far more effective than peak flow control, Ep values were still significantly greater than one, indicating a still unacceptably high level of risk of future instability. Study results showed that hydrograph matching based on the 2-year discrete event resulted in Ep values ranging from 3.3 – 4.1. This would correspond to a 100% probability of channel instability, based on field observations at over 45 study sites across 3 sub-watersheds in Santa Clara Valley (SCVURPPP, 2005). Even using the 50-year discrete event, Ep values were still 1.9 or greater for hydrograph matching, corresponding to an approximately 70% probability of instability. Flow duration control, which maintains the continuous distribution of pre-development sediment transporting flows, was the only control method sufficiently protective, with Ep values ranging from 0.8 - 1.1 for post-development conditions. Moreover, the flow duration control basin was smaller than the 50-year discrete event basin, revealing that the flow duration concept is a long-term optimized design approach, minimizing the volume and land area requirements necessary to achieve the stated objectives.

An appropriate guideline for large and small projects, and an alternative to the interim 2-year hydrograph matching requirement would be to develop, within a 6 month to one year timeframe, a local implementation tool based on flow duration control in the form of nomographs relating percent impervious area and soil type (infiltration rates) to BMP volume and land area requirements. The nomographs would be derived from continuous simulation modeling, using Ventura County-specific rain gauge records and local soil types. Ideally, the model would be calibrated using a local, undeveloped and gauged watershed data. Each large development project in an HAS, and/or the Copermittee, would be required to assess appropriate hydromodification standards and controls via the following protocol, as recommended by available literature: first conduct an assessment of the physical sensitivity of the downstream system. Then, if needed based on downstream sensitivity and ability to effect change in the watershed, size hydromodification controls using the nomograph tool based on the percent imperviousness of the proposed project. Finally, require the project proponent to provide the indicated storage and infiltration volume and area, either in the form of a single basin or in smaller units distributed throughout the project.

**New Development and Redevelopment – Selection and Sizing of BMPs**

| Page | Comment |
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| Pg. 50 | Part 4 E.1(e) requires that treatment control BMPs be properly designed and maintained in order to avoid the breeding of vectors. In addition to the concern about breeding vectors, treatment control BMPs should be selected, designed, and maintained to address the pollutants of concern.<br><br>Part 4 E.1(f) requires that projects select an integrated approach to mitigate stormwater pollution by using a suite of controls, in order of preference, to |

remove stormwater pollutants, reduce stormwater runoff volume, and beneficially reuse stormwater: 1) LID strategies, 2) integrated water resource management strategies, 3) multi-benefit Natural Feature BMPs, and 4) prefabricated/proprietary treatment control BMPS. First, it should be clearly stated that all projects are not required to utilize all four of these techniques. Second, some of these terms need to be clearly defined, such as items 2) and 3). Third, it is unclear as to why LID strategies are superior to integrated water resource management, which could potentially include storage and reuse of sufficient quantities of project runoff to completely mitigate the hydrologic impacts of a project. Finally, it is assumed that the 3rd option is referencing vegetated BMPs that provide habitat, recreational, or other benefits as well as water quality or hydromodification control. Again, it is unclear as to why multi-purpose vegetated BMPs (which could be implemented at any scale of development, from the lot scale up to a regional, watershed scale) are inferior to the first two options, when these types of facilities could also be designed to fully mitigate a project's potential water quality and/or hydromodification impacts.

Pg. 55 Part 4 E.III.1(b) requires all development projects equal to 1 acre or greater of disturbed area to implement post-construction treatment controls and BMPs. Although this provision is more stringent than the current Permit, it is not infeasible. However, given the small properties affected, this more stringent requirement should be coupled with preparation by the RWQCB of BMP templates for example small projects. Without these templates, little water quality benefit should be expected.

Part 4 E.III.1(c) requires implementation of post-construction BMPs for industrial parks and commercial strip malls with 5,000 square feet or more of surface area. Is this meant to be impervious area or total project area? Why are commercial strip malls identified as opposed to other types of commercial development? Does this include redevelopment projects? If so, is this trigger on new or replaced effective? impervious surfaces or total project area? It would provide more consistency to have one threshold, perhaps 5,000 square feet new impervious surface, for all types of industrial and commercial projects.

Pgs. 55-56 Part 4 E.III.2 provides a tiered numeric water quality design criteria based on project size using a 50-acre threshold. It is unclear how this threshold was derived. If there is a tiered system, it would more appropriately be based on the size and complexity of each BMP's tributary area. What if a project will disturb

98 acres, but it is made up of two 48-acre subwatersheds that are hydrologically independent? Should it be treated differently that one 48-acre project?

Projects are required to mitigate (infiltrate, filter, or treat) stormwater. Note that infiltration and filtration are types of treatment unit processes, so this statement is redundant. Projects should be required to provide treatment of stormwater runoff.

Following are comments on the sizing requirements in this section (note that suggested additional text is included in underline format):

Proposed Permit: "(1)(A) The volume of runoff produced by the 85th percentile 24-hour runoff event, determined as the maximized capture storm water volume for the area, from the formula recommended in *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998*); or"

Comment: It would be better to specify the use of the volume capture ratio (below) over the event capture ratio. Also, a minimum drain time should be specified as this directly impacts the basin sizing as well as BMP performance.

Proposed Permit (1)(B) The volume of annual runoff based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment <u>by the method recommended in the</u> Ventura County Technical Manual <u>(200X)</u>; or

Comment: Incorporate additional text and include the date and full citation for the Ventura Manual.

Proposed Permit " (1)(C) The volume of runoff produced from a 0.75 inch storm event, *prior to its discharge to a storm water conveyance system*; and/or"

Comment: This statement should be changed to require treatment prior to discharge to a receiving water body. This statement could be construed to disallow the conveyance of runoff to a treatment BMP.

Proposed Permit " (2) Hydrodynamic (Flow Based) Treatment Control BMP"

Comment: This is a misuse of the term "hydrodynamic". Flow-based in a better term.

Proposed Permit (2)(B) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from the local rainfall record; or

Comment: There is not one 85th percentile hourly rainfall intensity for all of Ventura County. Also, a project should use the closest rain gage, even if it is located in a neighboring county. A better methodology would be to perform an assessment of the long-term hourly rainfall amounts to ascertain at what flow rate would 80 percent of the average annual runoff volume be treated.

Proposed Permit: (2)(C) Ten percent of the 50-year storm design flow rate as determined from the methodology presented in xxxxx.

Comment: Insert additional text and provide a reference for the technical support for this calculation to achieve consistency in its determination.

Part 4 E.III.2(b) requires the use of continuous simulation modeling for projects that disturb a land area of 50 acres or greater. There are many issues with the requirement as drafted. Of primary concern is that no sizing criteria is included (e.g., 80 % of the average annual runoff volume shall be captured and treated). Other comments include:

- In general, it's easier to "abuse" the results from models than it is simpler, more-transparent methods. Guidance on the proposed BMP design standard (draw down rates, stage where bypass occurs, etc) and modeling methodology (input parameters, hydraulic formulas, etc) would be required in order to ensure semi-uniformity.
- The use of 15 minute interval data should be allowable, where available.
- The use of an adjustment factor for within hour rainfall variability is applicable to flow-based BMPs only, and only for those that do not have a storage within or upstream of the rainfall design rate. For flow-based BMPs, what kind of adjustment factor is required? Would this be a factor of safety in the final design, or some adjustment to model input data?

- For volumetric BMPs, the peak flow variability that may occur during an hour is expected to be absorbed in the BMP volume and is not significant in BMP performance (so there's probably no need for an adjustment factor with volume-based BMPs).

- There are no numeric BMP sizing objectives stated in Part 4 E.1. This condition should be deleted.

**Construction**

| Page | Comment |
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| Pg. 63 | Part 4 F.1 prohibits any grading to occur between October 1 and April 15 in areas of high erosivity, receiving water impairment (i.e., if project discharges to a 303(d) listed water body), or sensitive habitat (i.e., if project is within or adjacent to an environmentally sensitive area [ESA]) (projects adjacent to but downstream of ESAs would not impact an ESA). F.1.b.1 allows for a Grading Prohibition Variance if the project can demonstrate that certain water quality requirements can be met.<br><br>This is a significant change from the current Permit, which requires limited grading scheduled during the wet season to protect slopes and channels. It is not reasonable to prohibit wet season grading entirely. An analysis of the rainfall records within Ventura County showed that on average there are between 23 to 28 days within the 6½ month (approximately 195 day) wet season on which rain occurs. Since rain occurs only about 13% of the time during the wet season, a better more tailored option to control runoff would be to require a two-tiered approach to BMP implementation, with more stringent BMPs required in the wet season for sites with a high erosion potential. Examples include increasing the inspection frequency and reducing the amount of time allowed for corrective action and follow-up inspections; as well as requiring stabilization of graded soils within a certain period of time after active work has closed. |
| Pg. 68 | Part 4 F.6.1. restricts paving and repaving activity to exclude periods of rainfall or predicted rainfall unless required by emergency conditions. The language is vague, but should be interpreted as allowing the permittees to define in their implementation plans (e.g., the Storm Water Quality Management Program) what |

the wet weather limitations on paving activities should be, taking into account probability of precipitation. For example, the SWMP could prohibit paving activities if more than 0.25 inches of rain is predicted within a 48 hour period, and the storm has a more than 40% probability of occurring.

This provision should also apply to sealer application because the activity could result in similar wet weather impacts.

**Monitoring**

| Page | Comment |
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| Pgs. 4/F-15 | Finding B.8 states that "the California Stream Bioassessment Procedure (CSBP) is a cost-effective tool and standard protocol for assessing the biological and physical/ habitat conditions of stream segments for evaluation of the overall health of the watershed", and "this Order includes requirements to conduct bioassessments of natural streams and waterways." Attachment F (pg. F-15) states that samples shall be collected according to CSBP, or other method(s) approved by the Regional Board.<br><br>As discussed at the Bay Area Macroinvertebrate Bioassessment Information (BAMBI) Network Meeting in Oakland on January 30, 2007, the CSBP has fallen out of favor because the protocol can only be effectively applied to riffle habitats. Revised guidance for the state is being developed by the Surface Water Ambient Monitoring Program (SWAMP), in cooperation with CA DFG (draft guidance due in early 2007), and will be more similar to EPA's Environmental Monitoring and Assessment Program for bioassessment. The Permit should be updated to require the use of the most recent state-approved methodology for bioassessment. Also discussed at the BAMBI meeting was the caveat that bioassessment objectives are still being developed at the state level. Bay Area permittees identified significant implementation issues and other challenges associated with the revised bioassessment protocols. These include lack of direction for volunteer monitoring programs, the amount of resources required to collect recommended data and the resulting effect on the number of sites that can be sampled, lack of direction on how the data should be used, and comparability of data collected by CSBP protocols to data collected using revised protocols. In light of these issues, the draft Permit should be revised to require the use of the most recent state-approved methodology for bioassessment after the SWAMP guidance is issued. |

F-3 Attachment F A.11., relating to monitoring of mass emission stations, states that constituents not detected in more than 75% of the first 48 sampling events at a station need not be further analyzed unless the observed occurrences show concentrations greater then state water quality objectives. Mass emission stations are monitored 5 times per year, so it would take almost ten years to eliminate constituents from the monitoring program based on their non-detect status. We would suggest that perhaps that the dischargers be allowed to evaluate the data available to date and submit a report to the board that recommends a reduced monitoring suite with the option that some parameters be monitoring during all storms, once a year, or dropped. We also recommend that there should be some provision to eliminate parameters that are consistently below water quality standards but are detected.

In addition, Attachment F A.11 still requires the Principal Permittee to conduct annual confirmation sampling for non-detects during the first storm of the wet season at each station. Therefore, the monitoring requirement is not significantly reduced, even with supporting data from 48 sampling events. Therefore, elimination based on a smaller sample number is recommended to conserve fiscal resources.

F-3 Attachment F A.16 requires the Principal Permittee to correlate pollutants of concern to TSS loading, for the sampling events that are analyzed for the complete list of constituents in Attachment G. In our experience, one can find for some pollutants a correlation with TSS. For example total metals, etc. For other pollutants such as TDS and dissolved metals there is little or no correlation. Finally, we have found that once a correlation is established at one station, it is often not transferable to other stations, including those of similar land uses. So we recommend that this requirement be removed from the draft Permit.

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